CHEMISTRY

BOOKS - A N EXCEL PUBLICATION

CLASSIFICATION TO ELEMENTS AND PERIODICITY IN PROPERTIES

Question Bank

1. What would be the IUPAC name and symbol for the element with atomic number 120 ?

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2. How would you justify the presence of 18 elements in the $5th$ period of the Preodic Table ?

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3. The elements Z = 117 and 120 have not yet been discovered. In which family/group would you place these elements and also give the electronic configuration in cach case.

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4. Which of the following species will have the largest and the smallest size ? Mg, Mg^{2+}, Al, Al^{3+}.

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5. Which of the following will have the most negative electron gain enthalpy and which the

least negative ?

P,S,Cl,F. Explain your answer.

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6. Using the periodic Table, predict the farmulas of compounds which might be formed by the following pairs of elements,

Silicon and bromine.

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7. Using the periodic Table, predict the formulas of compounds which might be formed by the following pair of elements, aluminium and sulphur.

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8. Are the oxidation state and covelency of Al in $\left[AlCl(H_2O)_5\right]^{2+}$ same ?

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9. On the basis of quantum numbers justify that the sixth period table should have 32 elements.

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10. In terms of period and groups where would you locate the element with Z = 114 ?

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11. Write the atomic number of the element in the third period and group 17 of the period table.

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12. Which element do you think would have been named by

Lawrence Berkeley laboratory.

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13. Which element do you think would have been named by Seaborg's group.

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14. Why do elements in the same group have similar properties ?

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15. What do you mean by isoelectronic species ?

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16. Name the species that will be isoelectronic with Ar

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17. Name the species that will be isoelectronic with Mg^{2+}

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18. Name the species that will be isoelectronic with Rb^{+}

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19. $N^{3-}, O^{2-}, F^{-}, Na^{+}, Mg^{2+}, Al^{3+}$ what is comman in them ?

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20. $N^{3-}, O^{2-}, F^{-}, Na^{+}, Mg^{2+}, Al^{3+}$

Arrange them in the order of increasing ionic radii.

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21. Energy of an electron in the ground state of hydrogen atom is $-2.18 \times 10^{-18} J$. Calculate the inoisation enethalpy of atomic hydrogen in $Jmol^{-1}$.

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22. Among the second period elements the actual ionisation enthaply are in the order $Li < B < Be < C < O < N < F < Ne$.

Expalin why Be has higher ΔIH than B.

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23. Among the second period elements the actual ionisation enthaply are in the order $Li < B < Be < C < O < N < F < Ne$ explain why O has lower ΔIH than N and F ?

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24. How would you explain that the first ionisation energy of Na is lawer than that of

Mg but is second inoisation enthalpy is higher than that of Mg ?

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25. What are the main factors due to which the ionisation enthalpy of the main group elements tends to decrease down a group ?

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26. The first IE $\left(Kjmol^{-1}\right)$ of group 13 elements are

$$\frac{B}{801}A\frac{l}{577}G\frac{a}{579}I\frac{n}{558}T\frac{l}{589}$$

How would you explain the deviation from general trend ?

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27. Which of the following pairs would have more negative electron gain enthalpy ? O or F

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28. Which of the following pairs would have more negative electron gain enthalpy ? F or Cl

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29. Would you expect the second electron gain enthalpy O as positive, more negative or less negative than the first ? Justify your answer.

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30. Discribe the theory associated with the radius of an atom as it gains an electron

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31. Discribe the theory associated with the radius of an atom as it loses an electron

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32. Would you expect the first IE of two isotopes of the same elements to be the same or different ? Justify the answer.

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33. What are the mojor differece between metals and non metals ?

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34. The inceasing order of reactivity among group 1 elements is $Li < Na < K < Rb < CS$ whereas that among group 17 is $F > Cl > Br > I$. Explain .

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35. Assing the position of the elements with outer electronic configuration $ns^2np_4(n = 3)$

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36. Assing the position of the elements with outer electronic configuration $(n-1)d^2ns^2(n=4)$

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37. Assing the position of the elements with outer electronic configuration $(n-2)f7(n-1)d^1ns^2(n=6)$

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38. The first IE and second IE $\left(Kjmol^{-1}\right)$ and $da < a_e gH\left(kJmol^{-1}\right)$ of a few elements are given below:

Element	IE_1	IE_2	$\Delta_{eg}H$	Element	IE_1	IE_2	$\Delta_{eg}H$
I	520	7300	−60	IV	1008	1846	−295
II	419	3051	−48	V	2372	5251	+48
III	1681	3374	−328	VI	738	1451	−40

Which of the above is likely to be the least reactive element

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39. The first IE and second IE $\left(Kjmol^{-1}\right)$ and $da < a_e gH\left(kJmol^{-1}\right)$ of a few elements are

given below:

 Which of the above is likely to be the most reactive element

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40. The first IE and second IE $\left(Kjmol^{-1}\right)$ and $da < a_e gH\left(kJmol^{-1}\right)$ of a few elements are given below:

 Which of the above is likely to be the most reactive non- metal

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41. The first IE and second IE $\left(Kjmol^{-1}\right)$ and $da < a_e gH\left(kJmol^{-1}\right)$ of a few elements are given below:

Element	IE_1	IE_2	$\Delta_{eg}H$	Element	IE_1	IE_2	$\Delta_{eg}H$
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Which of the above is likely to be the least reactive non-metal

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42. The first IE and second IE $\left(Kjmol^{-1}\right)$ and $da < a_e gH\left(kJmol^{-1}\right)$ of a few elements are given below:

Element	IE_1	IE_2	$\Delta_{eg}H$	Element	IE_1	IE_2	$\Delta_{eg}H$
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Which of the above is likely to be the metal that can from stable binary halide(MX_2)

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43. The first IE and second IE $\left(Kjmol^{-1}\right)$ and $da < a_e gH\left(kJmol^{-1}\right)$ of a few elements are

given below:

Element	IE_1	IE_2	$\Delta_{eg}H$	Element	IE_1	IE_2	$\Delta_{eg}H$
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II	419	3051	−48	V	2372	5251	+48
III	1681	3374	−328	VI	738	1451	−40

Which of the above is likely to be the metal that can from perdominantly stable covalent halide (MX) ?

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44. Predict the formulae of stable binary compounds that would be the formed by the combination of following pairs of elements. Li and `O

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45. Predict the formulae of stable binary compounds that would be the formed by the combination of following pairs of elements. Mg and `N

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46. Predict the formulae of stable binary compounds that would be the formed by the

combination of following pairs of elements. Al and `I

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47. Predict the formulae of stable binary compounds that would be the formed by the combination of following pairs of elements. Si and `O

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48. Predict the formulae of stable binary compounds that would be the formed by the combination of following pairs of elements. P and `F

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49. Predict the formulae of stable binary compounds that would be the formed by the combination of following pairs of elements. Elements 71 and `F

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50. In the modern periodic table, the period indicates the value of

A. f atomic number

B. atomic mass

C. principle quantum number

D. azimuthhal quantum number

Answer: C

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51. The size of iso electronic species $F - Ne$ and Na^+ is affected by

A. Nuclear charge

B. principle quantum number

C. elctron-electron interaction in outer orbitals

D. none of the factors because their size is the same

Answer: A

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52. Considering the elements B,Al,Mg and K, the correct order of their metallic charcter is

A. $B > Al > Mg > K$

B. $Al > Mg > B > K$

C. $Mg > Al > K > B$

D. $K > Mg > Al > B$

Answer: D

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53. considering the elements F,Cl, O and N, the correct order their chemical reactivity in terms of oxidising property is

A. $F > Cl > O > N$

B. $F > O > Cl > N$

C. $Cl > F > O > N$

D. $O > F > N > Cl$

Answer: B

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54. Account for the following: Ionisation enthalphy of nitrogen is greater than that of oxygen

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55. Account for the following: Atomic radius decreases from left to right in a period

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56. Account for the following: Electronic gain enthalphy of F is less negative than that of Cl

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57. Development of priodic table have made the study of elements and their compounds easiere Discuss the main features of Mendelvee's periodic table

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58. Development of priodic table have made the study of elements and their compounds easiere State the madern periodic law

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59. Development of priodic table have made the study of elements and their compounds easiere Give the name of the element with otomic number 112

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60. A graph of aromic radius versus atomic number is given blow: What do you understand from this graph ?

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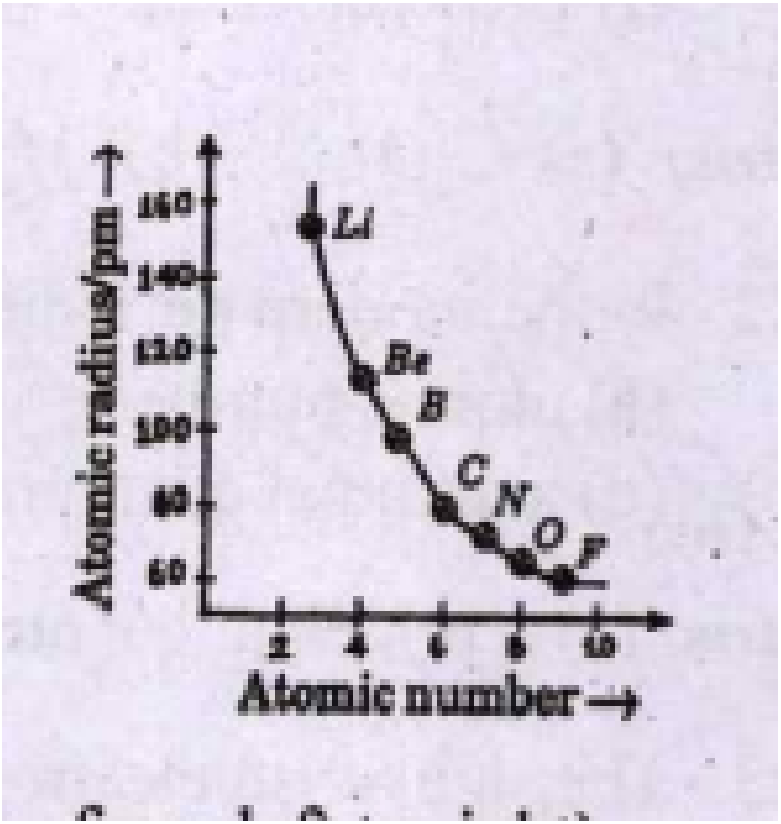
61. A graph of aromic radius versus atomic number is given blow: Account for the observation that cations are always smaller than the parent atom while anions are always

smaller the parent atom.



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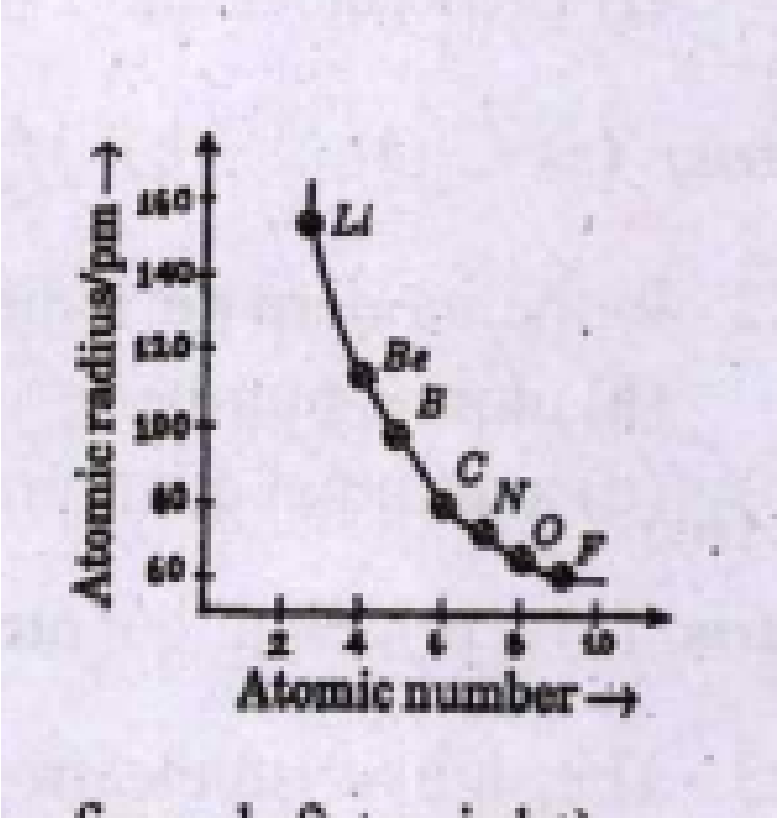
62. A graph of aromic radius versus atomic number is given blow: Using the above graph, how will you account for the varitation of inoisation enthalpy in a period.



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63. Garph showing the variation of atomic radius with atomic number for alkali metals is given below:

Comman on the variation of atomic radius with increase in atomic number in a graph. Give reason.

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64. What is meant by isoelectronic species ?

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65. Select the isoelectronic species from the following:

$O^{2-}, F^{-}, Na^{+}, Mg^{2+}$

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66. State the modern periodic law

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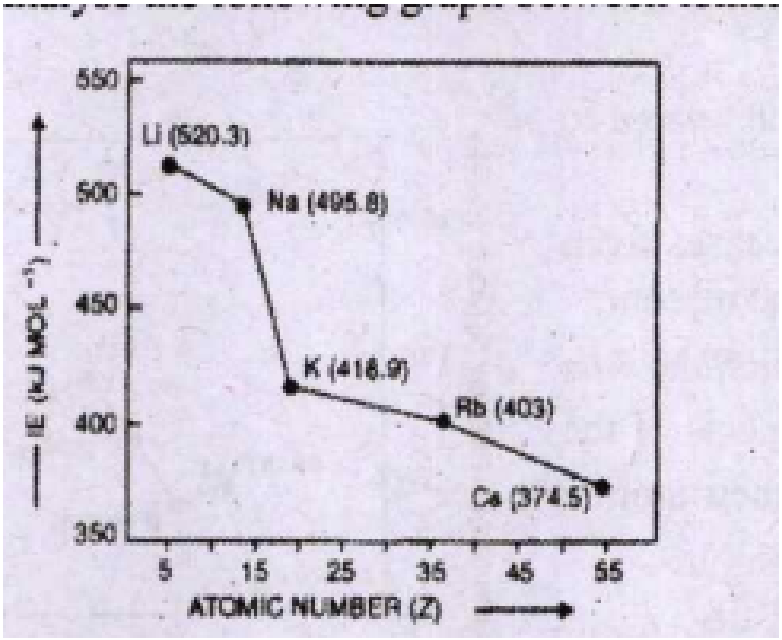
67. Moseley modified Mendeleev's periodic law based on his observation on the x-ray spectra of elements.The IUPAC name of the element with atomioc number 109 is .....



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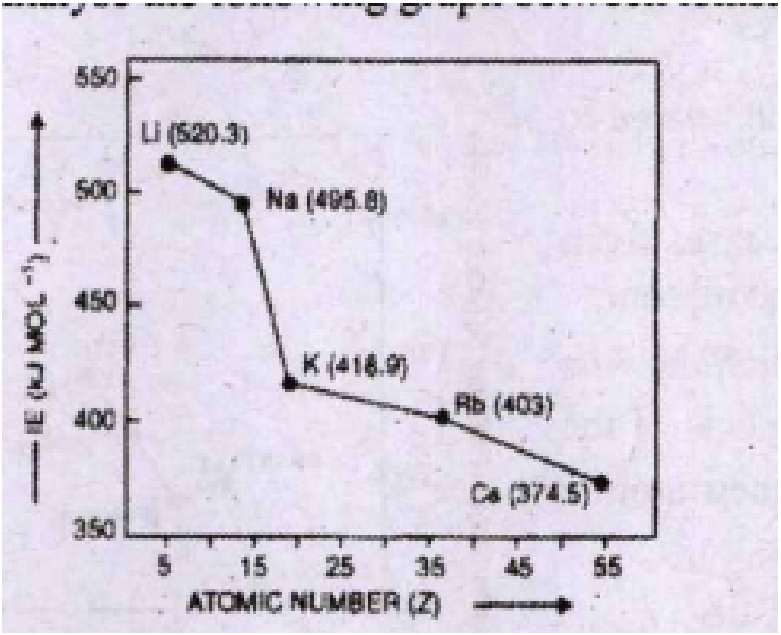
68. Analyse the following graph between ionisation enthalpy and atomic number.



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69. Electron gain enthalphy is the amount of energy involved when an isolated gaseous atom accepts an electron to form a monovalent anion

the value of the electron gain enthalpy of halogens are given below:

F : `-328 KJ mol^(-1) Cl - 349 KJ mol^(-1) Br : -325 KJ mol^(-1) I : -295 KJ mol^(-1) Why the negative electron gain enthalpy decreases from chlorine iodine?

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70. Electron gain enthalphy is the amount of energy involved when an isolated gaseous atom accepts an electron to form a monovalent anion

the value of the electron gain enthalpy of halogens are given below:

F : `-328 KJ mol^(-1) Cl - 349 KJ mol^(-1) Br : -325 KJ mol^(-1) I : -295 KJ mol^(-1)Chlorine has more negative electron gain enthalpy than fluorine. why ?

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71. Identify the largest and smallest species from those given below :

$O^{2-}, F^{-}, Na^{+}, Mg^{2+}$

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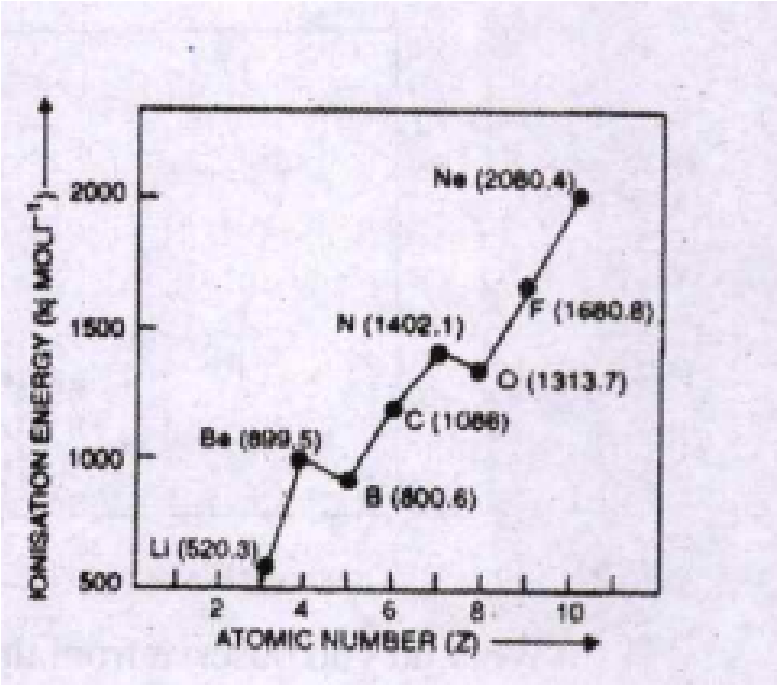
72. The reactivity of an element is very much related to its inoization enthalpy. Observe the following graph in wich the first ionozation enthalpies $(\delta_1 H)$ of elements of the sercond period are ploptted agiains their atomic

number (Z):



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73. IUPAC has made some recommendations to name elements with atomic number above 100.

what would be the name for the elements with atomic number 104 ?

74. Electronegativity is the ability of an atom to attract a shared pair of electrons. Name a numerical scale of electronegativity of elements

75. Give the reason for the following: Phosphorus froms PCl_5 whille nitrogen cannot from NCl_5

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76. Give the reason for the following: The first ionisation enthalpy of oxygen is smaller compared to nitrogen.

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77. The first member of a group of elements in the s an dp block differs from the rest of the family in chemical behaviour. Write any one reason for this.

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78. Write the general outer electronic configuration of d-block elements.

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79. The first ionization enthalpy of magnesium is higher than that of sodium. Explain.

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80. Give any two characteristics of transition elements.

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81. Does the ionisation enthalpy decreases along a group ? Give reasion

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82. Name of elements with atomic numbers greater than 100 are given by IUPAC The atomic number of the elment with IUPAC name Ununbium is _____

A. 112

B. 110

C. 111

D. 114

Answer: A

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83. Name of elements with atomic numbers greater than 100 are given by IUPAC Why is potassium considered as an s - block element ?

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84. Name of elements with atomic numbers greater than 100 are given by IUPAC the first inoisation enthalpies of second period element generally increase from lewft to right along the period. Give reason for this general trend.

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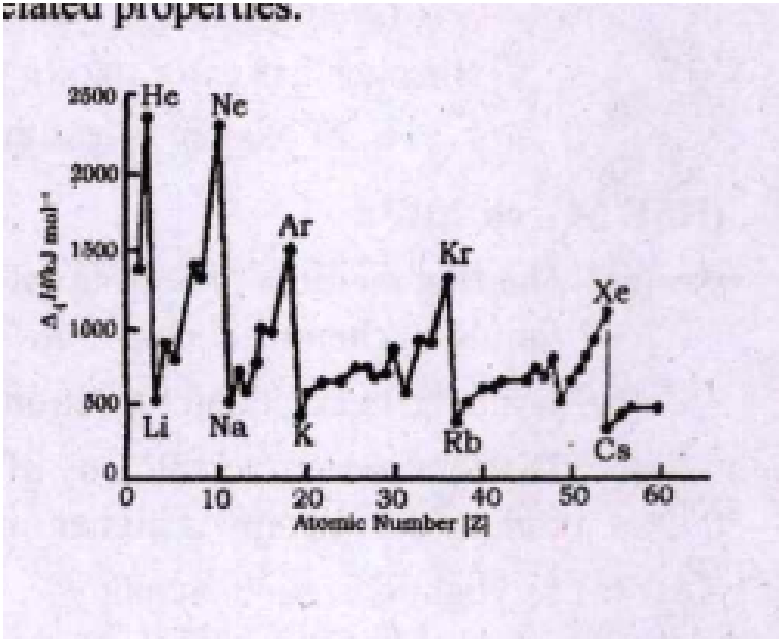
85. Ionization enthalpy and atomic radius are closely related properties. Analyse the following graph:

What conculation can you derive from the

graph regarding the first ionization enthalpies of alkali metals and noble gases ? Justyfy.



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86. Accounting from the following : Ionization enthalpy of Nitrogen is greater than that of

Oxygen.

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87. Accounting from the following : 2nd period elements show anomalous behaviour

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88. A group of ions are given below . Find one pair which is NOT isoelectronic.

$Na^+, Al^{3+}, O^{2-}, Ca^{2+}, Mg^{2+}, F^-, N^{3-}, Br^-$

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